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(c.s.)

ARMONIZZAZIONE DEGLI *STANDARDS* TECNICI E DELLA SICUREZZA TRA NORMATIVA COMUNITARIA E DIRITTO INTERNO: LE RICADUTE DELLE DIRETTIVE COMUNITARIE SULLA RETE EUROPEA DEL TRASPORTO FERROVIARIO

1. *Introduction.*

By and large, the reform of European railways has concentrated on domestic issues: the organisation of railway undertakings and their relations with the state. Despite the potential of rail to provide competitive cross border services, the international dimension has largely been missing. Railways are still run on national lines to meet national needs and international services are usually conceived as the addition of international services, though recently some truly international services have been launched, like Thalys and Eurostar, on the bases of bilateral or multilateral agreements. The Community, for its part, has made a start on integrating national systems with the directive on the interoperability of high speed rail, whose implementation is underway. However, it has still to tackle the question of conventional rail and this autumn the Commission is to present a communication on the integration of conventional systems, covering technical harmonisation in particular.

What is the purpose of having technical regulations in the railway sector? The essential aim is safety: technical specifications are part of a large body of rules intended to guarantee safety. There are other aims of course, such as protection of the environment and

health and technical compatibility. What then is the point of technical harmonisation at the European level? There are two reason for it.

The first is to extend "*interoperability*", which means the capacity of trains to move across frontiers without having to stop. The main reasons to stop are to change locomotives and crews, to perform checks and to exchange data about the train, for technical, regulatory or operational reasons. Stopping at frontiers slows down services, reduces reliability and punctuality and wastes resources. Consequently it lessens the competitiveness of international rail transport. Removing the barriers to interoperability is a way of improving performance, but one means among many.

The second aim of technical harmonisation is to help create a single market for railway works, supplies and services, but above all for supplies (equipment of different kinds). The market remains segmented along national lines, with the larger railways at any rate buying from national companies. Community specifications would be the basis for calls for tender under the public procurement directive and so are necessary to open the market (this is not to say that having such specifications would alone suffice to create a Community wide market.

These aims are distinct, although a given specification may serve both purposes. There has been much confusion about this, not helped by the fact that the title of directive 96/48/EC only mentions interoperability and not market integration, when it fact serves both ends.

Interoperability: the UIC system.

Europe's railways were built to serve national needs to national standards. A degree of interoperability has been achieved throughout Western and Central Europe[1]. Passenger carriages move across frontiers - it is not necessary to change trains; so do freight

[1] The exceptions are the Iberian peninsula and countries that once were part of the Russian empire (wide track guage).

wagons - there is no need to tranship goods. This has been so for a long time.

It is not government that laid down the technical and operational rules for such interoperability. Rather the national railways mandated their association, the Union Internationale des Chemins de fer in Paris to draw up standards for the rolling stock (and infrastructure to some extent). The standards are drafted by officials from national railways and adopted by the UIC, for which a high degree of consensus is needed.

The leaflets are not legally binding but there are agreements under private law between the railways on passenger carriages (RIC) and freight wagons (RIV). Under these, the railways have agreed to accept and haul rolling stock meeting a set of UIC standards. This process does not cover locomotives or multiple units because of the enormous difficulty of harmonising electrical and signalling systems.

Also compliance with the UIC guidelines is not a necessary condition of interoperability. A number of cross-border services are operated under bilateral or multilateral agreements between the railways, including high speed services.

2. *What has been achieved and what not?*

As said, compliance with RIC and RIV allows interoperability of passenger carriages and freight wagons but not of locomotives or of multiple units. In other areas, there has not been harmonisation; in some cases there is good reason for this, in others a failure to reconcile national interests.

Gauge.

The track gauge (distance between the rails) is the same, except for Spain, Portugal, Ireland, Northern Ireland, Finland (and the Baltic republics). The loading gauge (maximum permitted size of

vehicle) varies widely from railway to railway and, often, from line to line. This matters above all for freight, as the largest loads cannot be carried everywhere. Also axle loads vary between railways and between lines. (See maps 1 and 2, pagg. 170 and 171).

Standardising gauges through Europe would be enormously expensive and have no commercial or socio-economic justification. This is not to say that Member States and railways could not progressively eliminate divergences that reduce competitiveness, for example employment of standard gauge on certain routes in Spain or increases in the loading gauge on main lines in the United Kingdom. What would be unreasonable, because immensely expensive and economically unjustified, would be obligatory specifications for gauges[2].

Electricity.

The national railways electrified at different times, using the technology available that met their needs. As a result there are five different electrical systems in operation, with a complication that pantographs vary as well (see map 3, pag. 172).

Reconstructing national systems would be prohibitively expensive and unrealistic, though some DC systems may be reaching their capacity links and need replacing for that reason. Interoperability can be achieved by multi-current locomotives, usually without a heavy cost penalty, or by using diesel.

Signalling.

This is the greatest single technical barrier to operating locomotives across borders. Over the past few decades, increasing technical sophistication and divergence has created a severe impediment to interoperability. There are now thirteen-fourteen in-

[2] Set of specialised passenger carriages, with its own tractive power, designed to be operated as a unit.

compatible electronic systems (see map 4, pag. 173). A locomotive operating across borders has to carry on board the equipment needed for several systems.

An additional problem that has emerged in recent years is electromagentic incompatibility between locomotives and signalling system. This means that a new type of locomotive has to be cleared for the infrastructure over which it passes, an expensive process.

Documentation and information technology.

When trains or rolling stock cross frontiers, railway undertakings have to exchange information:

- on the composition and characteristics of the train, needed for operational purposes like braking schedules
- on the consignments carried by freight trains

All the European railways have some form of IT system for traffic management, but none have the same. The UIC has promoted interfaces between systems but they are incomplete, so much information is exchanged by paper. This is a source of mistakes and of serious delays at frontiers, particularly of freight trains.

Also freight shippers increasingly demand a system to track and trace their consignments, a service provided in the United States and by road hauliers in Europe. The railways collectively have not yet succeeded in developing and applying IT systems that work satisfactory across borders and are interested in Community support.

Train crews.

The general practice is to change train crews at frontiers, although some operate high speed trains across borders under bilateral arrangements. Clearly most train crews work within their states, and changing crews at frontiers may sometimes be the eco-

nomically best solution. Nevertheless working crews across frontiers could raise the performance of international services. For this, it would be necessary to define, at Community level, the basic qualification of train crews for domestic operations and the additional knowledge required to operate across a frontier: of routes, of signalling, of driving rules, of safety procedures and so on. Language qualifications have also to be considered, as the lack of a common language (like in aviation) can be a problem for safety.

3. *Recent developments.*

High speed directive.

Interoperability of high speed rail was a new challenge. First stopping at frontiers was inconsistent with high speeds. Second, high speed trains were designed as integrated sets, so the old solution of changing locomotives was irrelevant. Third, some high speed trains were likely to operate over several frontiers, so loading the necessary electrical and signalling equipment would add to costs (it is the solution at present).

From the early 1990's, the Commission worked on a high speed directive, finally adopted in 1996. This directive creates a process for writing and adopting technical specifications for the high speed network, that would be obligatory. These technical specifications for interoperability (TSI) would serve the two aims: interoperability and integrating the market for railway equipment.

The directive has several, interesting features:

- a hierarchy of requirements but with an emphasis on performance specifications;
- an association (Association Europeenne pour l'Interoperabilité ferroviaire - AEIF) of both the railways and the railway industry to propose drafts; this brings industry into the process;
- independent bodies to certify conformity with specifications, and a system of mutual recognition.

However, while intended to apply to the trans-European network, the directive allows exemptions, for instance for projects at a late stage of development or whose viability would be compromised by meeting TSI.

The directive represents a break from the traditional approach to technical harmonisation in the railway world: specifications are decided and enforced by bodies distinct from the railways. The first TSI are now being prepared.

European Rail Traffic Management System

The incompatibility of signalling and automatic crossing systems is the greatest barrier to interoperability. Consequently the Commission has pushed forward and aided financially a major research and development project, the European Rail Traffic Management System (ERTMS). This is intended to be the basis of future Community specifications. At present the system is being tested in several Member States.

Essential features of the ERTMS are that:

— it covers in-cab equipment and different forms of transmission (track-side and radio);
— it allows different levels of train control;
— it is designed to overlay existing signalling systems, so that both trains equipped with ERTMS and with the national system can operate on the same infrastructure.

It is suitable to both high speed and conventional lines and can be implemented in stages across the networks.

What policy for the interoperability of conventional rail?

Various characteristics of conventional rail should be taken into account. One is that there is a huge stock of infrastructure and rolling stock, which is renewed slowly; consequently harmonisation can only be gradual. Also much is used for domestic services

only and does not need to be interoperable; indeed interoperability could add to the cost and complexity of infrastructure and rolling stock only used for domestic services.

A major question is which routes and which services would gain competitiveness through interoperability. As a first step the Commission had an analysis made of the routes on which there is the potential to expand international rail transport. Maps 5 and 6 (pagg. 174 and 175) show these key links, which represent quite a small part of the trans-European rail network shown in map 7 (pag. 176).

To achieve interoperability there is sometimes a choice between changing the infrastructure, for example signalling and electrification, or installing additional equipment in locomotives or multiple units. The challenge is to make the right choice or find the right mix for a given route or sub-network. This is a matter for long term commercial decisions by railway undertakings and by infrastructure managers, as much as for public authorities.

Finally, interoperability is only one means of improving the competitiveness of international rail transport. There are many other ways in which services can be improved.

A cost-benefit analysis done for the Commission suggests that most of the benefits (time savings and reductions in operational costs) would come from removing barriers, to the interoperability of freight transport. The study also suggests that harmonisation of infrastructure is less attractive than integration of timetables and minimising border stops, without technical modifications.

The railway supply industry

Traditionally the markets for railway supply were often closed to extra-national competition. The main railways procured equipment from the local industry; the smaller railways naturally imported more. The market had certain particularities:

— the railways were responsible for much design work, with suppliers applying the technical specifications provided by railways engineers;
— specifications were set with national needs in view;
— the railways tended to be vertically integrated, for instance doing much maintenance and repair work themselves;
— costs of entering the sector were high, projects were large and lasted several years, and technical compatibility between old and new equipment was very important.

All this led to close relations between a railway and a small number of national suppliers and little competition.

In the 1990's this picture has changed to some extent, but the sector still remains segmented. There are, however, major forces for change at work, for example.

— the consolidation of the industry around 3-4 big players, seeking economics of scale in R&D and design and rationalisation of production
— strong pressure to cut the costs of equipment, leading to standardisation of product ranges
— arrival of new operators without links to suppliers

The impact of such factor varies considerably from one Member State to another.

In the medium term, Community rules on public procurement should have an influence on contracts as they are renewed, but there remains a long way to go.

Access to the network

Community legislation has created limited access rights to railway infrastructure (Directive 91/440); some Member States have gone further in liberalising. Clearly access could be blocked or made difficult if specifications are not clear and if the conformity assessment process is not independent from providers of rail

transport services (implied by Article 86). The approval process covers not only certification of rolling stock but also of signalling, electrical supply, train crews etc.

The high speed directive established independent "notified bodies" for certification of conformity with technical specifications. A number of Member States have set up independent regulatory bodies; others continue to leave such regulation to the railways (infrastructure managers could be given responsibilities in this area if independent from companies offering transport services). A complication, however, is that certification has not only to cover types of equipment or general skills of train crews, but also their deployment on individual lines with their own particularities.

Until such time as a full set of Community specifications is adopted, operators will have to respect national requirements or UIC standards. It is essential that these are clearly defined and fully transparent, which is not guaranteed at present.

Finally, the choice made between changing infrastructure and changing rolling stock, to achieve interoperability, has consequences for new entrants. Adding equipment to rolling stock will tend to mean higher entry costs than if the same functions are performed by infrastructure.

Ideas about a Community measure for conventional rail

The first priorities for harmonisation are likely to be:

— signalling systems (ERTMS)
— IT applications for traffic management, particularly freight, and for consignment tracking
— cross border operation of train crews
— minimum Community specifications for the interoperability of rolling stock; probably based on RIC/RIV but updated and extended to multiple units.

However it is also for the railways and the railway industry to define their priorities. There needs to be a real dialogue between

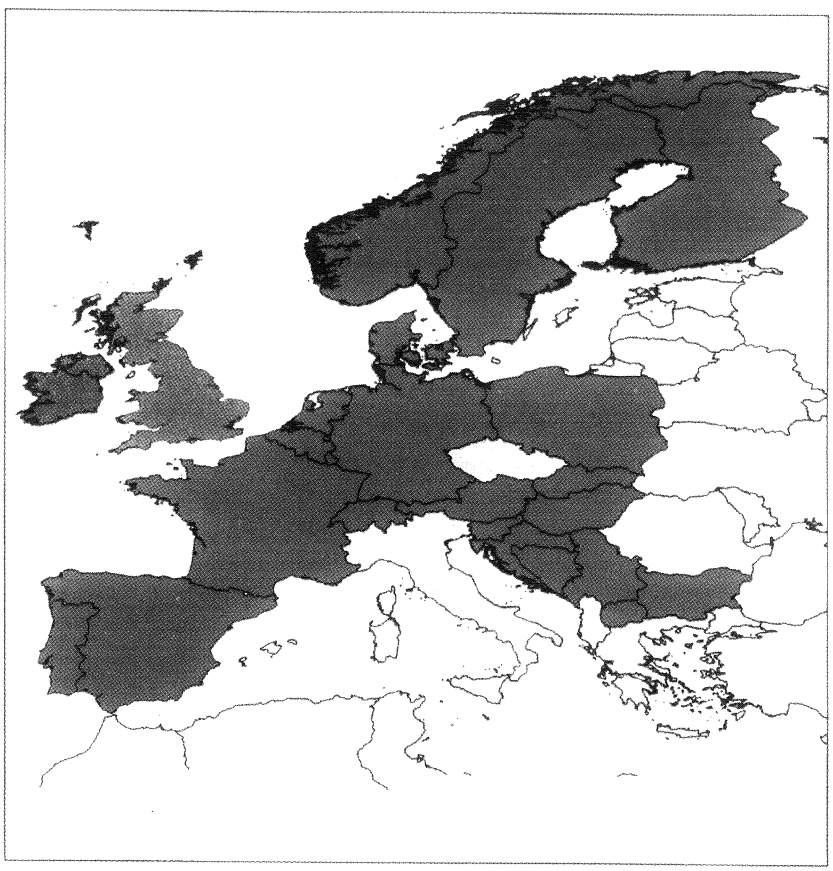
Community institutions, on the one hand, and the railways and industry on the other.

Independence and harmonisation of conformity assessment, the guarantee of mutual recognition, and, at any rate for a transitional period, transparency of national requirements are also priorities.

One possibility would be to extend the high speed process to conventional rail, but to focus harmonisation work on the above mentioned priorities. TSI developed for high speed rail could be extended to conventional rail; others would not be relevant. The Association Européenne pour l'Interopérabilité Ferroviaire could be mandated to prepare proposals in these areas. Important questions would be those of the network covers: (conventional trans-european networks, key links, or left open to be determined by the investment decisions of the railways) and of the balance between investing in infrastructure and in rolling stock.


TRACK GAUGE
1435mm.
1524mm.
1600mm.
1668mm.
SYMONDS
TRAVERS MORGAN

Map 1

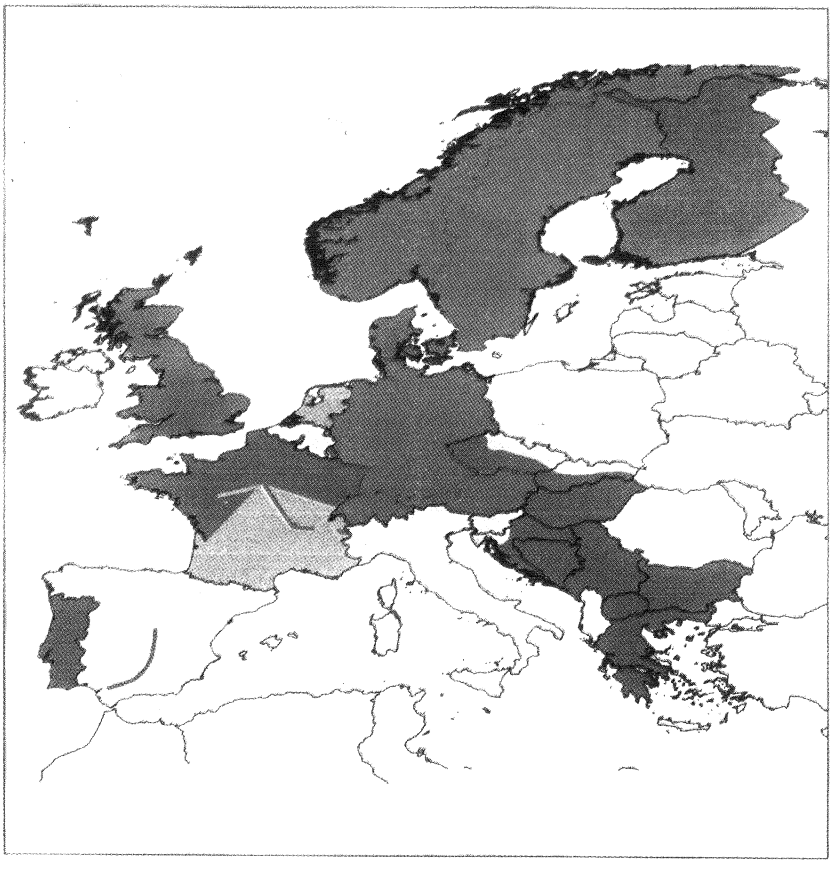


MAXIMUM PERMISSIBLE AXLE LOADS

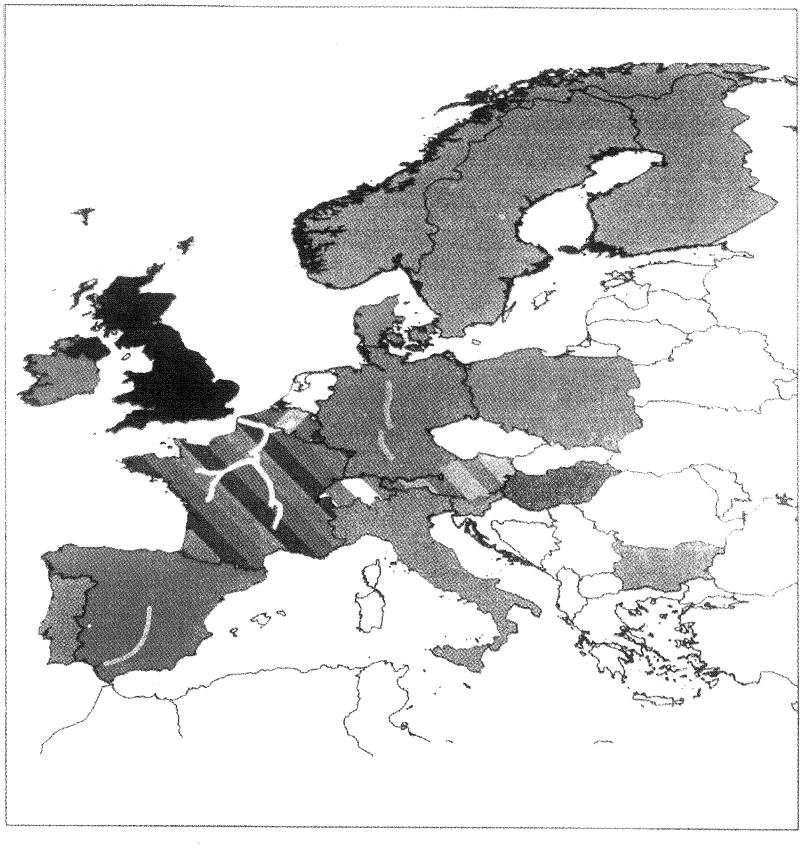
- 18.6 tonnes
- 20.0 tonnes
- 22.5 tonnes
- 25.0 tonnes
- 25.5 tonnes

SYMONDS
TRAVERS MORGAN

Map 2


ELECTRIFICATION SYSTEM
750V dc
1.5kV dc
3kV dc
15kV 16Hz ⅔ ac
25kV 50Hz ac
SYMONDS
TRAVERS MORGAN

Map 3

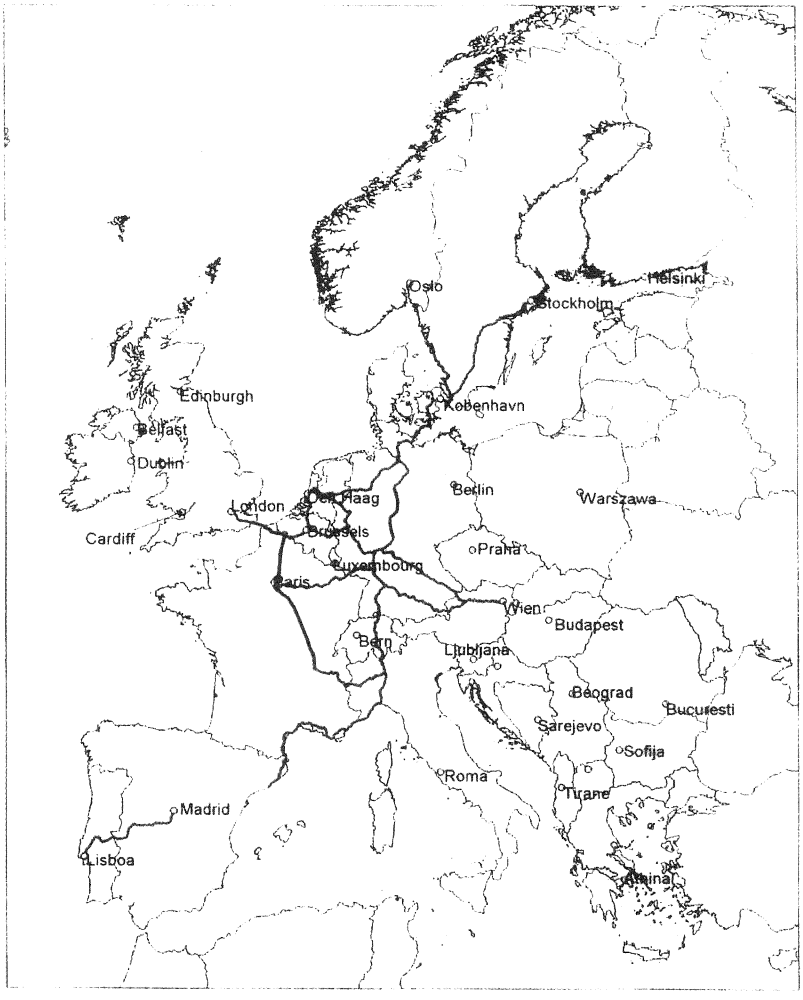


SIGNALLING SYSTEM

- INDUSI
- LZB-ZUB
- KROKODIL
- TZB
- TVM300/430
- ZUB 121/123
- EBICAB 700
- KVB
- PRÉANNONCE
- CAWS
- BACC
- ATB
- ASFA
- AWS
- EVM
- KHP
- SIGNUM

SYMONDS
TRAVERS MORGAN

Map 4



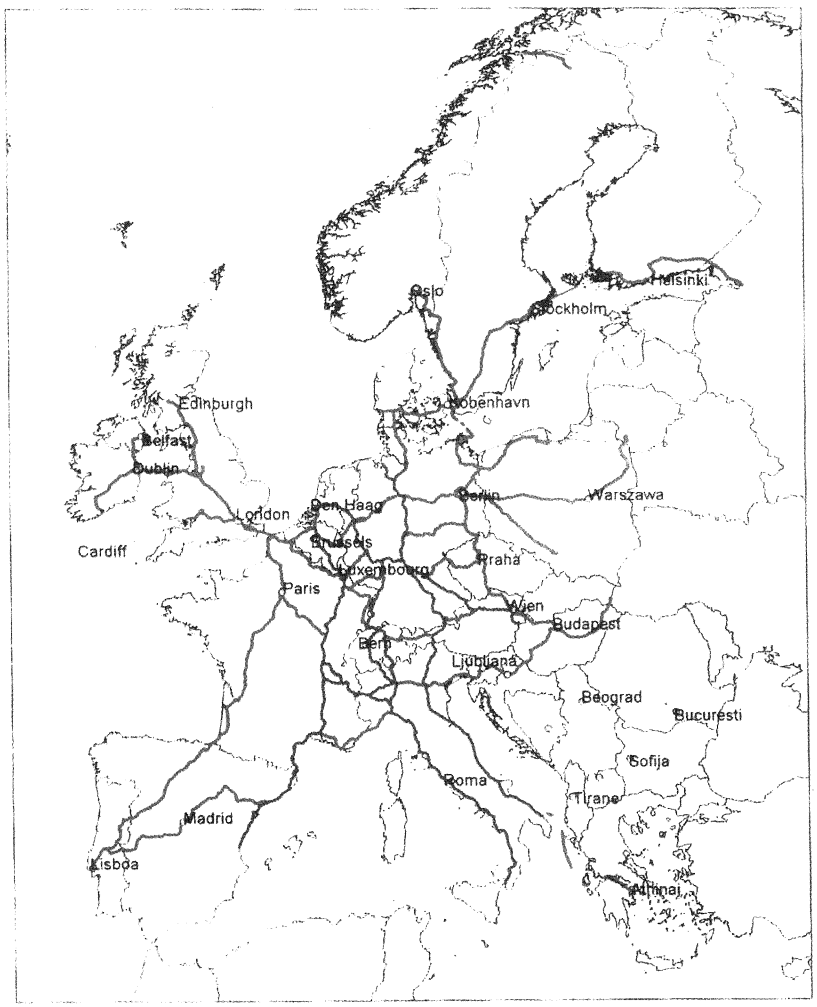
KEY LINKS FOR INTEGRATION - PASSENGER

—— **CONVENTIONAL LINES**

—— **HIGH SPEED LINES**

SYMONDS
TRAVERS MORGAN

Map 5



KEY LINKS FOR INTEGRATION - FREIGHT

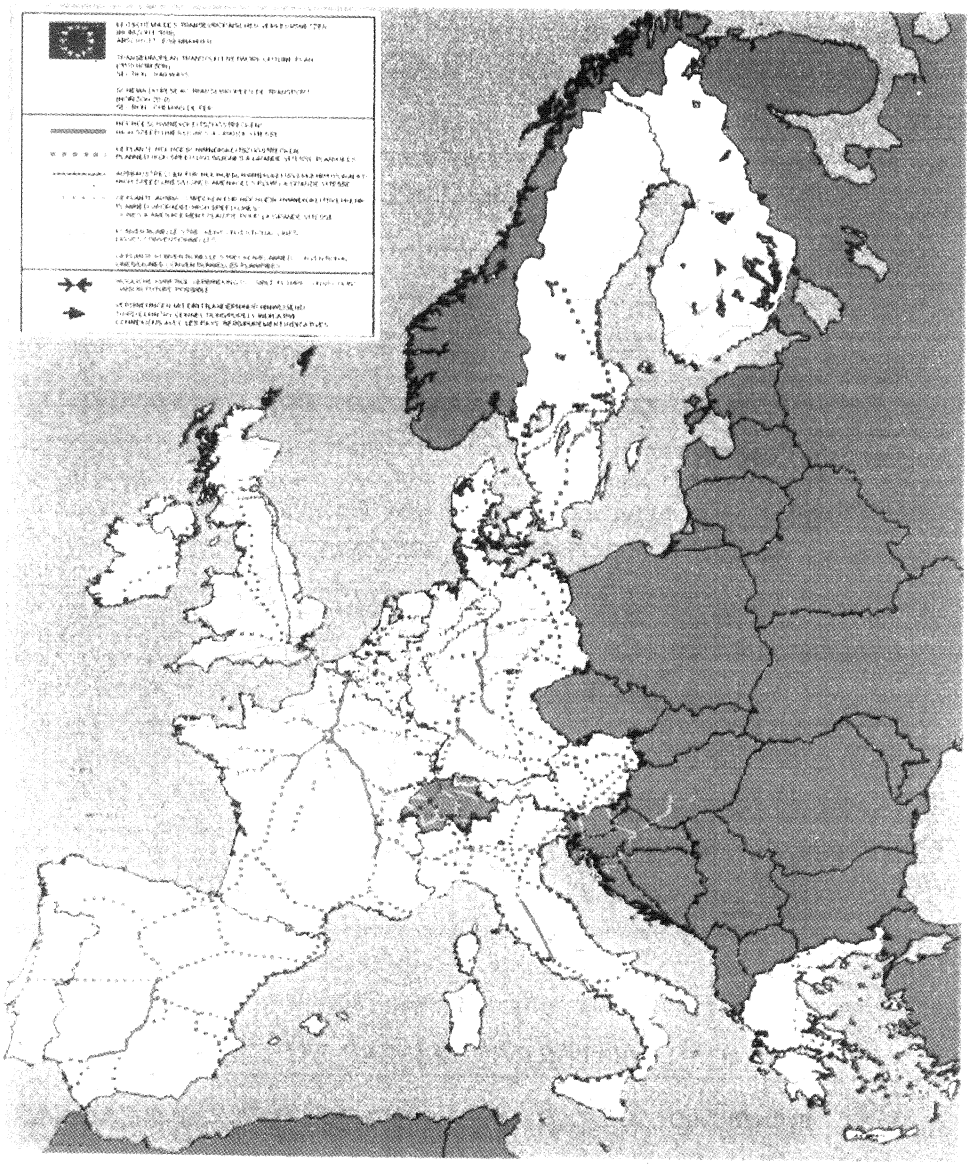
RAIL ROUTES

FREIGHT FREEWAYS

SEA LINKS

SYMONDS
TRAVERS MORGAN

Map 6



TRANSEUROPEAN TRANSPORT NETWORK OUTLINE PLAN

Map 7

AGOSTINO LA BELLA

(c.s.)

Mi sembra che questa relazione abbia completato efficacemente il quadro della politica comunitaria del trasporto ferroviario, sottolineando come, accanto ai problemi politici, economici, organizzativi, manageriali, esistono anche particolari problemi di standardizzazione. Qualcuno di questi problemi è di tale gravità da non ammettere una soluzione fattibile, in quanto i costi di standardizzazione sarebbero effettivamente troppo elevati.

Credo che si possa quindi procedere con il dibattito e affrontare gli argomenti trattati dai relatori in queste due giornate. Mi piacerebbe sentire la voce dei dottorandi cui questo Convegno è dedicato.

DIBATTITO

GUIDO RINALDI BACCELLI
(Ordinario di Diritto della Navigazione nell'Università "Federico II" di Napoli)

Vorrei innanzitutto congratularmi con il prof. Fanara per la preparazione di questo Convegno non soltanto per il livello delle relazioni, ma anche per il supporto documentale, che è veramente di altissima qualità e servirà come base per una considerazione approfondita dei problemi del settore.

Sono felice di intervenire sotto la presidenza del Prof. La Bella, che costituisce uno dei principali punti di riferimento per il trasporto in genere e per il Consiglio Nazionale delle Ricerche in particolare.

Desidero soltanto ripetere quello che in questa sala ho detto alcuni anni fa: a monte del problema del pubblico servizio c'è un problema di base, ovvero cosa debba intendersi per pubblico servizio quando il mercato non è autonomamente sufficiente a garantire il godimento da parte dei cittadini dei diritti costituzionalmente protetti. Si tratta di prerogative pubbliche irrinunciabili, in quanto il godimento dei diritti costituzionalmente protetti, in questo caso il diritto alla mobilità, garantito dall'articolo 18 della Costituzione della Repubblica, è un diritto irrinunciabile che la nostra Carta costituzionale, come la Carta costituzionale tedesca, privilegia rispetto a tutte le altre norme di diritto internazionale e comunitario, perché riguarda l'esercizio concreto della democrazia reale del Paese.

Non ho mai visto il trasporto in Italia così malridotto come oggi. Come pendolare, non ho mai visto questi diritti fondamentali della persona così duramente calpestati. E allora più che una domanda desidero fare una raccomandazione: vorrei che da questo convegno uscisse un forte invito alla protezione di questi diritti costituzionalmente protetti.

AGOSTINO LA BELLA
(c.s.)

Vediamo se c'è qualche altra domanda, qualche intervento o richiesta di chiarimento.

Vorrei sentire la voce dei dottorandi, visto che questo Convegno è dedicato loro. C'è un intervento programmato. Prego.